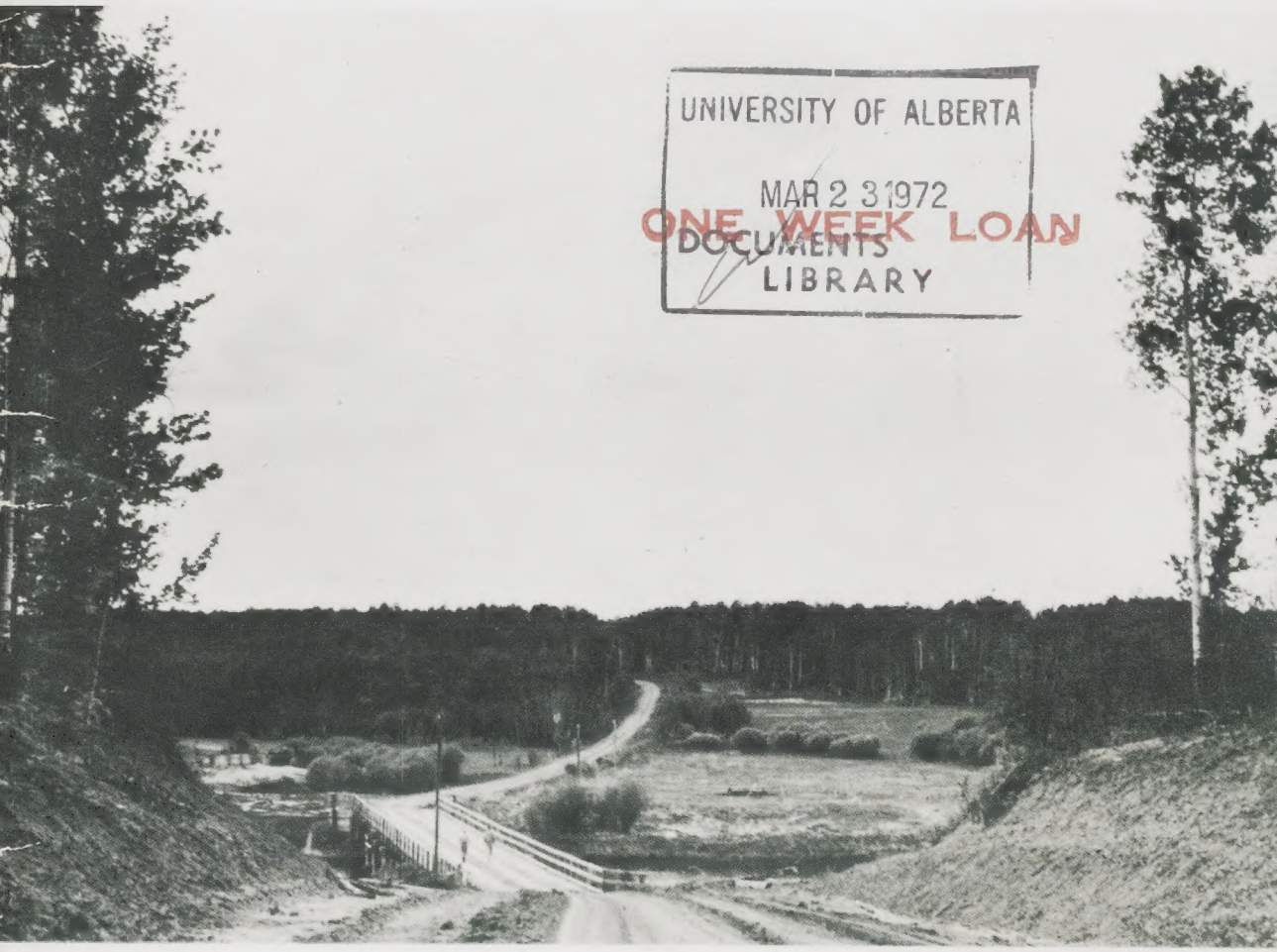
Forest Resources

of the

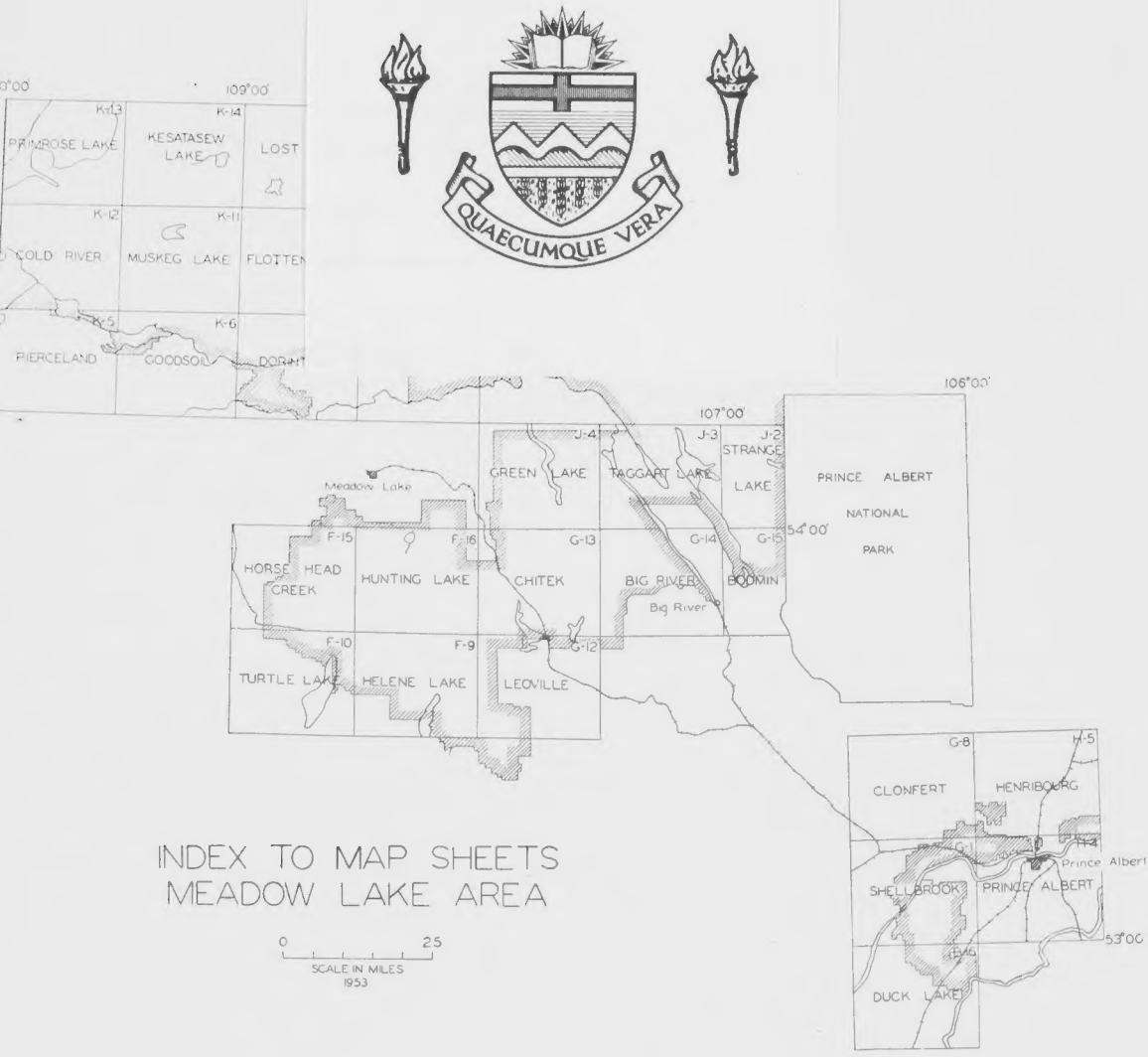
MEADOW LAKE AREA

Of Saskatchewan



Forestry Branch
DEPARTMENT OF NATURAL RESOURCES
PROVINCE OF SASKATCHEWAN

1954



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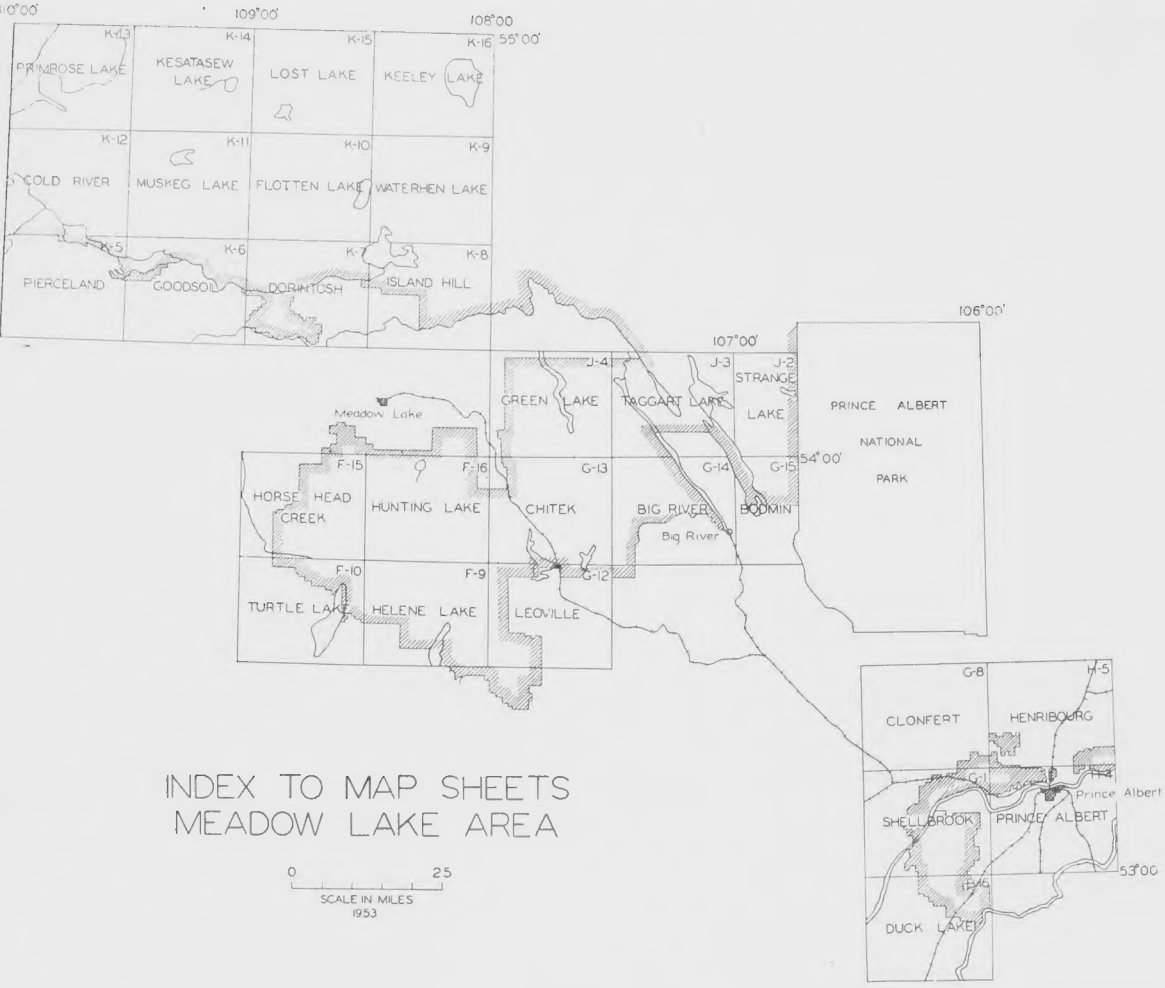

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FOREST RESOURCES

of the

Meadow Lake Area

of Saskatchewan

Forest Inventory Series — Report No. 3

DEPARTMENT OF NATURAL RESOURCES
PROVINCE OF SASKATCHEWAN
1954

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Photo credits — Thanks are extended to T. Morrell, E. C. Wyldman, A. Kabzems, Fire Control and Construction Branches for making photographs available.

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THE SASKATCHEWAN FOREST INVENTORY

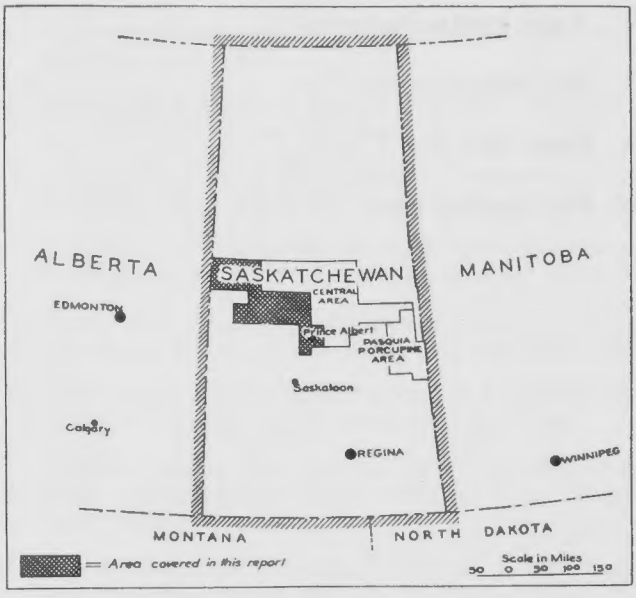
The forest inventory survey was started in 1947, following a recommendation by the Royal Commission on Forestry of the same year, to determine the extent and nature of Saskatchewan's forest resources. This work is being carried out by the Forestry Branch, Department of Natural Resources, with financial aid since 1951 from the Dominion Government under The Canada Forestry Act.

The Meadow Lake Area is the third to be surveyed. The Pasquia-Porcupine inventory report was published in 1952 and a similar one of the Prince Albert Area in 1953. A report on the Cumberland Lake - Flin Flon Area has been initiated.

Forest inventory secures the basic forest statistics for the broader planning of a general forest policy and supplies the data in a form in which it can be applied to other surveys for the final management plan. The use of aerial photos, combined with comparative ground sampling and the use of statistical methods in the compilation form the principal basis of the survey. Inventory has two main divisions of activity, namely, the preparation of forest cover-type maps and the compilation of volume estimates for the areas surveyed.

The final form of an inventory map is a coloured lithographed sheet on a one-inch-to-one-mile scale. One map sheet covers about 350 square miles and is the area unit for the inventory statistics. Fifty-six such map sheets have been issued to date.

The rate of growth of Saskatchewan's forests is also being investigated, as still another phase of the forest inventory. In all cases the results of the special growth studies are adjusted to fit the actual stand tables of the inventory volume sampling in each region and sub-type.



Location of Survey Areas
Fig. 1

THE MEADOW LAKE AREA

The area takes its name from the town of Meadow Lake, the principal town, railway terminus and population centre of this part of the province. At the turn of the century, it was known as "Lac des Prairies" and consisted of an Indian Reserve and a small Metis settlement with only one small trading post supplied from the Hudson Bay store at Green Lake.

In 1907 a Roman Catholic Mission was built with hand-sawn lumber. In 1908 the first white settler arrived and was followed by a few trappers. But it was not until after 1912, when the land was first surveyed, that settlers began to homestead this area. About this time the Government cut a trail south to Battleford and erected a telegraph line. In 1914 the name of the local Post Office was changed from "Lac des Prairies" to "Meadow Lake." The settlement grew very slowly until 1931 when the Canadian Pacific completed its rail line. Since that time its growth has continued rapidly and at present, with a population of 3,000, it is a prosperous community. In 1952, approximately 4 million bushels of grain, 211 cars of livestock, 288 cars of pulp, 50 cars of lumber, 50 cars of fish, 8 cars of alfalfa seed, 85 cars of fuelwood and 40 cars of railway ties were shipped from this point.

The Meadow Lake Area, as described in this publication, occupies a portion of the land enclosed between 52° 45' and 55° latitude, and 105° 30' and 110° longitude. (See the Index map). There is a total of 3.9 million acres of Provincial Forest, including productive and non-productive forest, non-forested land and water. Most of it, or 82.8 per cent, is contained in the Meadow Lake District and 17.2 per cent in the Prince Albert District of the Provincial Department of Natural Resources. The forest inventory survey could not be restricted to the limits of a single district due to the availability and the coverage of aerial photography and the base maps. In the summary report for the province, inventory statistics will be recast and correlated with the administrative district boundaries.

(a) Forest Harvesting.

Looking for suitable farming land, the settlers have advanced far into what are primarily forest areas. The successful ones have been able to establish good farms, while many of them have been forced to abandon their efforts and hopes due to the poor soil. Many others are practising mixed farming or ranching where suitable pastures exist. (Photos No. 1 and No. 2).

Farming is sometimes combined with some seasonal employment, such as lumbering, trapping, fishing, mink ranching, etc. This combined utilization of labour, farm machinery, horses and so on, is beneficial to both the farmers and the lumber industry. (Photo No. 3).

Photo No. 1. Mixed farming is recognized.

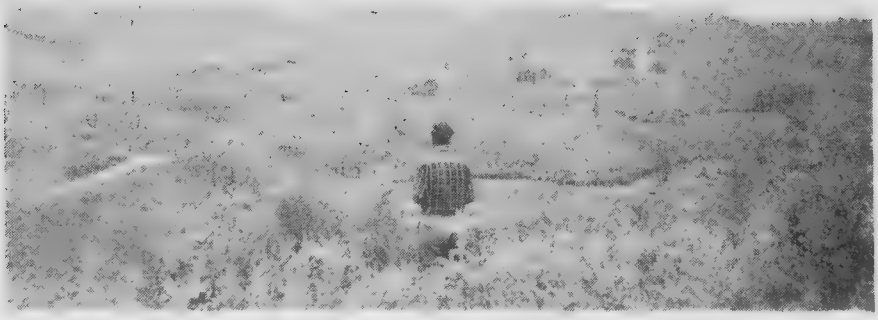


Photo No. 2. This land is not suitable for grain farming but is good for cattle grazing.

Photo No. 3. Farming and lumbering go hand in hand.

There are no big stationary sawmills in the Meadow Lake Area, the common type being the portable sawmill and, as a rule, the sawmill goes to the timber.

About 10 to 12 million board feet of sawtimber of all species is harvested every year on this area. Most of this lumber is used by local settlers to build their homes and farm buildings. Only a small proportion of it is shipped to the markets outside the district. In addition to this, approximately 2 to 2.5 million board feet of lumber is cut for the local box factories in Meadow Lake and Prince Albert. An average of 35 - 50,000 railway ties and 8 - 10,000 cords of fuelwood are cut annually. Due to some forest fires in the past about 25,000 cords of fire-killed pulp and boxwood have been produced in the last 3 or 4 years. (Photo No. 4).

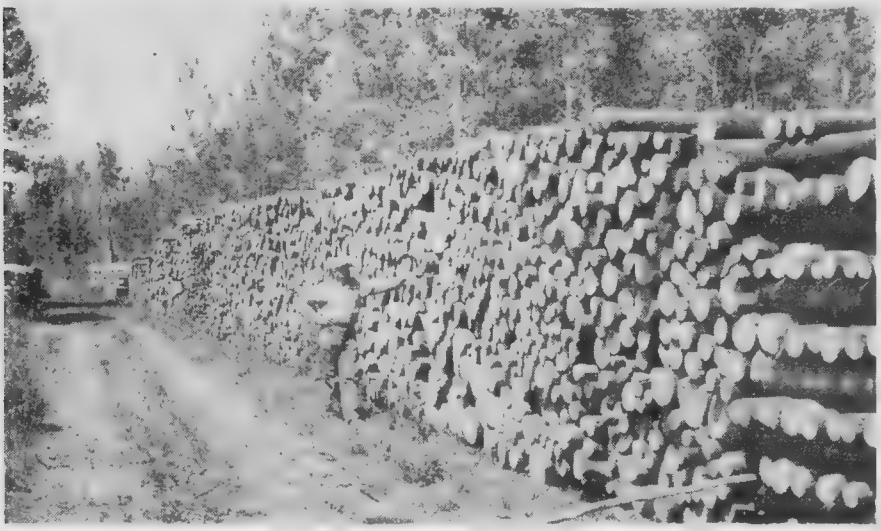


Photo No. 4. Fire-killed pulpwood has high acceptance in the trade.

When this cutting of fire-killed stands is completed, the yearly average will drop to a normal of 4 - 5,000 cords of sap-peeled pulpwood.

Salvage operation of fire-killed spruce is a very noteworthy attempt to lessen the timber losses caused by forest fires. It reduces the hazard of probable fires in the future and supplies dry and light wood which can be transported economically to distant markets in Eastern Canada and the United States.

The present cut of softwood species is a little over a half and the cut of hardwoods is about one quarter of the current annual increment on this area. In other words, the increment exceeds the present drain.

Even taking into account the losses due to fire and other causes, the utilization could be doubled on this area, without fear of reducing the present stock.

(b) Road Construction.

The Meadow Lake area is served by four main, gravelled highways two railroads and two air services. Many extraction roads are now under construction while several more are planned for the future in order to reach and facilitate the management of some remote and, at present, inaccessible timber areas. Photos No. 5 to No. 7 show the starting conditions and the final stage of this effort.

Photo No. 5. Former road conditions.

Photo No. 6. Reconstruction.

Photo No. 7. Present road conditions.

(c) Fire Protection.

Besides having the timber utilization in mind, new road establishment is wisely combined with the fire-protection program. The fireguards are constructed for motorized traffic. Since 1946, approximately 300 miles of fireguard-roads have been constructed in the Meadow Lake District alone.

There are 12 primary steel towers and 10 secondary fire lookout towers to protect this area. To keep a constant watch on the forest wealth, the "boxes" of the lookout towers are made large enough to provide comfortable living quarters for the towerman so that he is able to keep a sharp eye on the forests even in his spare time. (Photo No. 8).

Photo No. 8. A constant watch is kept on Saskatchewan's forest wealth.

Standby crews are employed during the fire season, and are equipped with motor vehicles, bulldozers, two-way radios, etc. Ground and air patrols are carried out for fire detection purposes. Fast action on fires in roadless areas is taken by dispatching fire-fighting parachutists, the Saskatchewan Smokejumpers.

The importance of good public relations is realized and public co-operation and education are sought through radio messages, fire-protection signs, programs of Forest Conservation Week, displays and lectures in schools, etc.

As a result, Saskatchewan's forests stay green and forest fires, as illustrated in Photo No. 9, are fewer each year.

Photo No. 9. Every year less and less such smoke is blackening Saskatchewan's blue sky.

FOREST AREA

Provincial Forests in the Meadow Lake Area, as presented in this publication, occupy 3.9 million acres of land, including that covered by water. Of this total area 2. 5 million acres (or 64.7 per cent) are classified as productive forest and nearly 0.9 million acres (or 23.0 per cent) as non-productive, i. e., not capable of producing a forest crop of merchantable size within a reasonable period of time. It includes treed muskegs and a proportion of softwood stands judged to be stagnant.

Due to the general changes of climate or local improvement of drainage, these areas have a tendency to become productive.

A third class is called non-forested or waste land and consists of slightly less than 0.1 million acres or 2.5 per cent of the Provincial Forest land.

Water occupies over 380,000 acres or 9.8 per cent of the area.

Hardwood cover types occupy about 1.13 million acres or 45 per cent of the productive forest land.

Softwood stands rank second in area by occupying 23 per cent, while mixedwood stands amount to only 16 per cent of the productive forest land. This very small proportion of the mixedwood forest is a peculiarity of the Meadow Lake Area.

Smaller size classes predominate in the Meadow Lake Area. Two-thirds of the productive area is occupied by younger stands under 50 feet in height. More than a half (or 53 per cent) of these stands is hardwoods, 18 per cent mixedwoods and 29 per cent softwoods. (Two - thirds are jack pine stands).

This proportion reflects the results of forest fires in the past. It is not a very pleasant one from the forest management point of view.

Only 36,270 acres contain mature timber stands ripe for harvesting. More encouraging are stands of the third size class 50 to 70 feet in height covering nearly 400,000 acres. These stands are approaching maturity and in a few stands utilization can be started now.

Proper cutting on these stands will help maintain the logging on a balanced and permanent level until the younger stands reach their merchantability.

AREA DISTRIBUTION

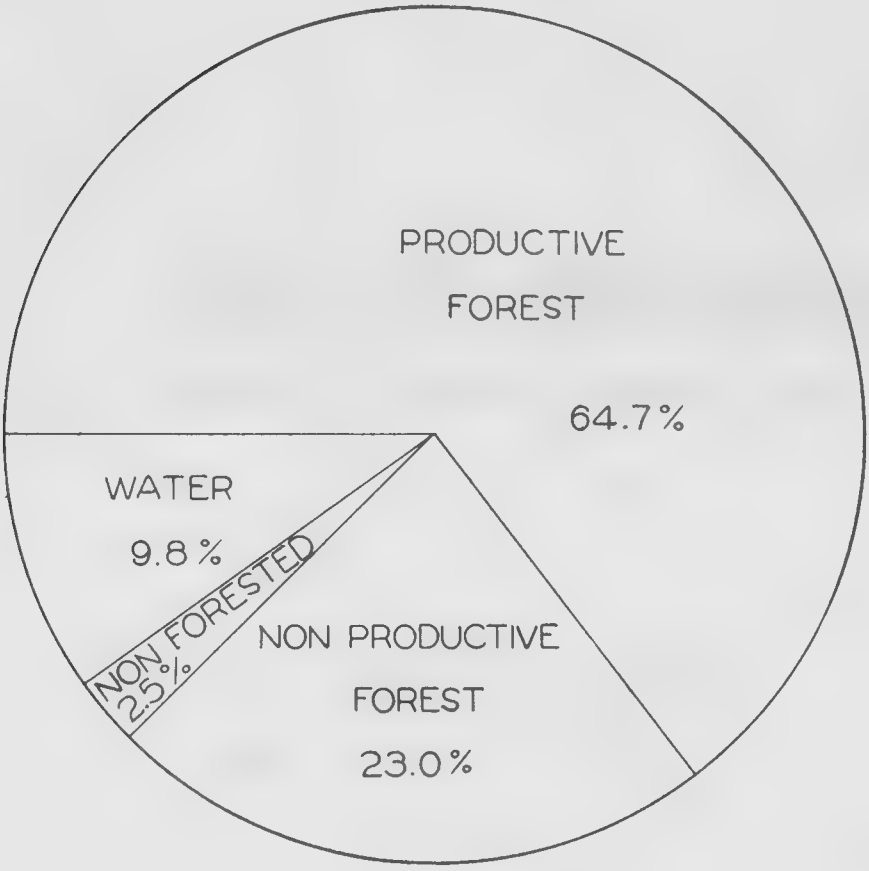


Figure 2 (Source Table 1).

PRODUCTIVE FOREST AREA

DISTRIBUTION BY COVER TYPES

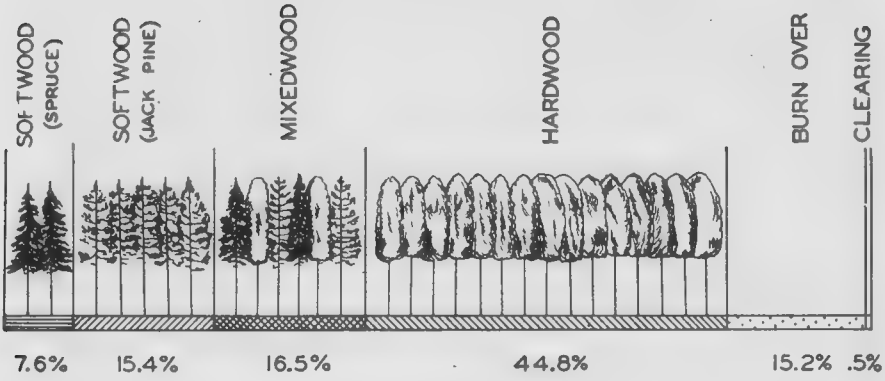


Figure 3 (Source Table 2)

PRODUCTIVE FOREST AREA

DISTRIBUTION BY SIZE CLASSES

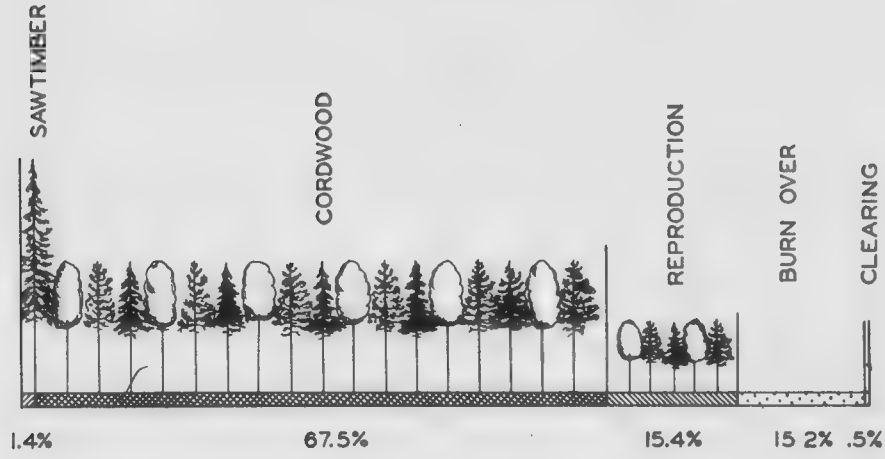


Figure 4 (Source Table 2)

TIMBER VOLUMES

(a) Sawtimber Volume.

Sawtimber volume is the volume of trees 9.6 inches and over D. B. H. (diameter at breast height) regardless of stand size-class, expressed in board feet, International 1/4" scale.

There is a little over 1.9 billion board feet of sawtimber in trees 10 inches and over in the Meadow Lake Area. Of this amount 1.1 billion board feet is hardwood and 0.8 billion board feet softwood.

White spruce sawtimber, the most valuable sawtimber species is estimated at 400 million board feet. If only trees of 14 inches D.B.H. and over are considered (Table 4A) this volume is reduced to 137 million board feet. Ninety-four million board feet of the total white spruce volume is found on the sawtimber areas, i. e., in stands over 70 feet in height and ripe for harvesting. The volume of trees from 14 inches D.B.H. comprises only a half or 47 million board feet on these areas. However, not all this volume is available for cutting. Some of it occurs in inaccessible areas or such scattered stands that it cannot be economically cut.

This example indicates some of the factors which must be considered in translating the results of this total wood inventory into practical harvesting policies.

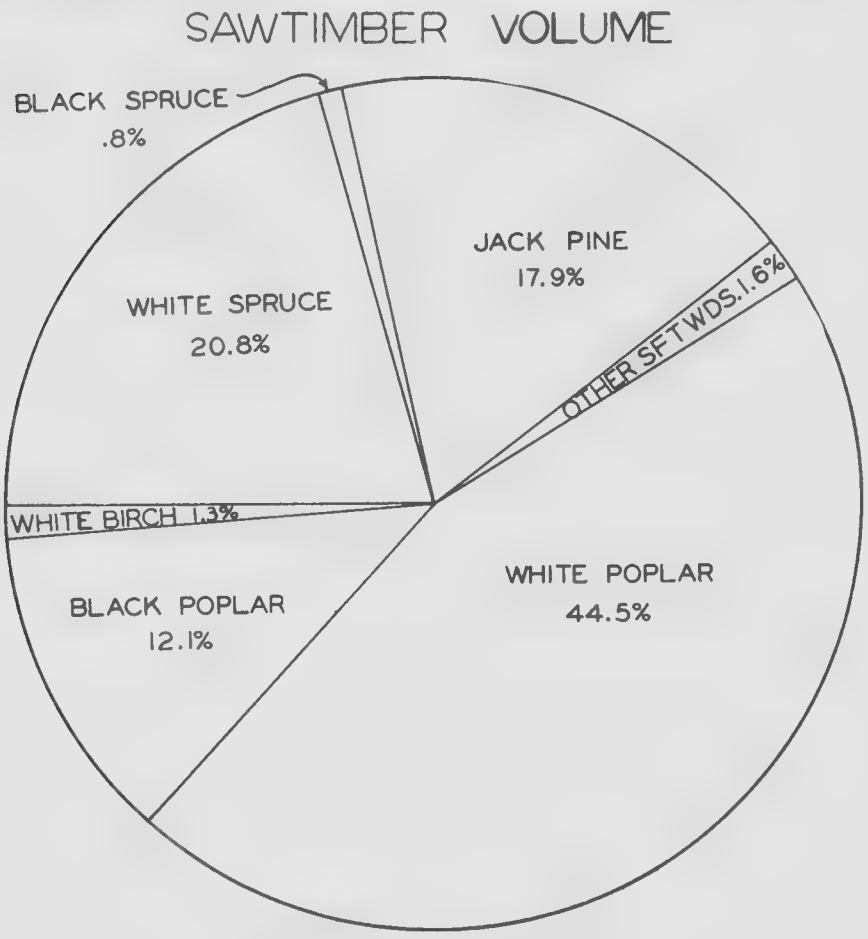


Figure 5 (Source Table 4)

(b) Cordwood Volume.

Under cordwood volume here is understood the volume of solid wood inside bark contained in trees 3.6 to 9.5 inches in diameter, expressed in standard cords of 128 cubic feet of stacked rough wood.

There are 15.4 million cords of wood in smaller trees 4 to 9 inches in diameter. Sixty per cent of this total cordwood volume consists of hardwoods and only forty per cent softwoods. Jack pine species lead with 3.3 million cords or 54 per cent of the softwoods, followed by white spruce with 1.6 million cords or 26 percent. The volume of black spruce is fairly small, only 886,000 cords or 14 per cent of the softwoods.

In this group the proportion of white spruce is favourable and promises good sawlog stands in the future. However, the production of pulpwood at the present time and in the future has to be based mainly on the jack pine species.

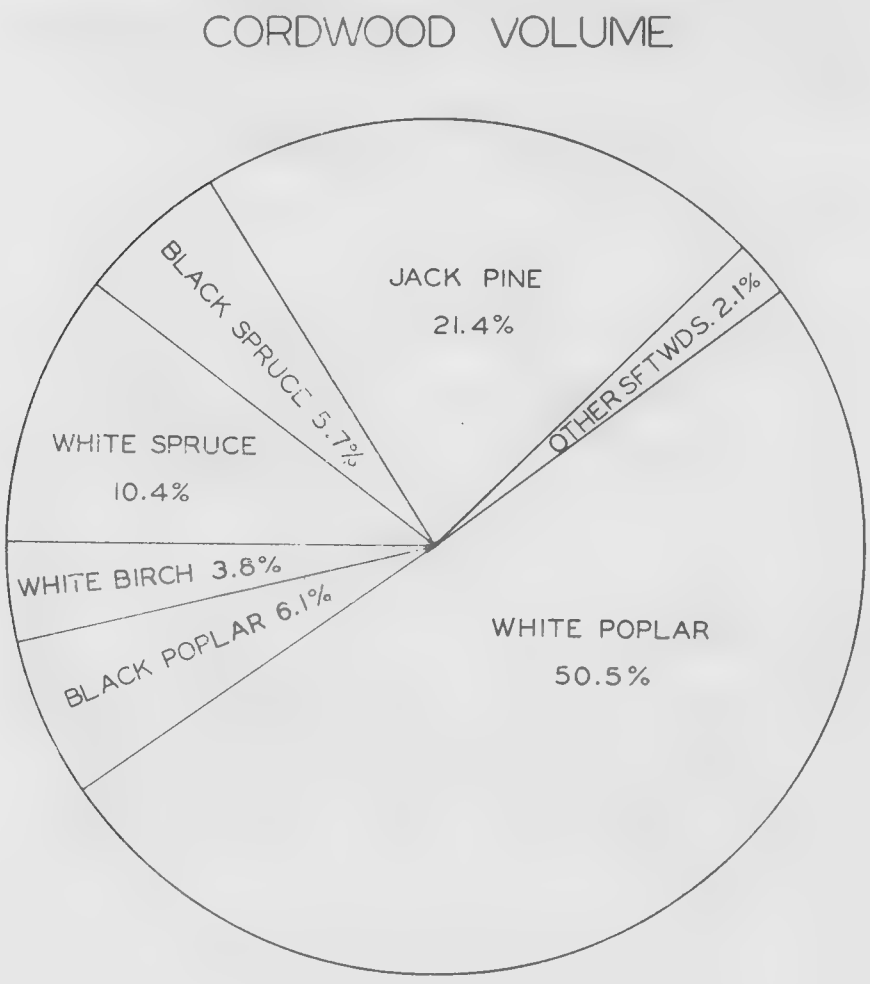


Figure 6 (Source Table 5)

(c) Merchantable Cubic Foot Volume.

There are 1.69 billion cubic feet of merchantable volume in the Meadow Lake Area; 59 per cent being hardwoods and 41 per cent softwoods. White poplar is the leading species, while jack pine, the major softwood species, is the second in abundance.

On the basis of cubic foot volume, there is 1.3 billion cubic feet or 77.3 per cent of wood in the smaller 4 to 9 inch diameter group and only 22.7 per cent in saw timber class (10 inches D.B.H. and over). Table 6A shows the volume and percentage of the 4 inch trees by species in the cordwood volume group (4 to 9 inches D.B.H.).

This proportion of the volume distribution indicates the predominance of younger stands.

If this is the case, such a representation of younger stands is sound and adaptable for the future management of the forests, although not having very much value at present. On the other hand, if it is caused by the overstocking or retarded growth of the stands, this proportion should be improved by proper management practices to favour the larger dimensions.

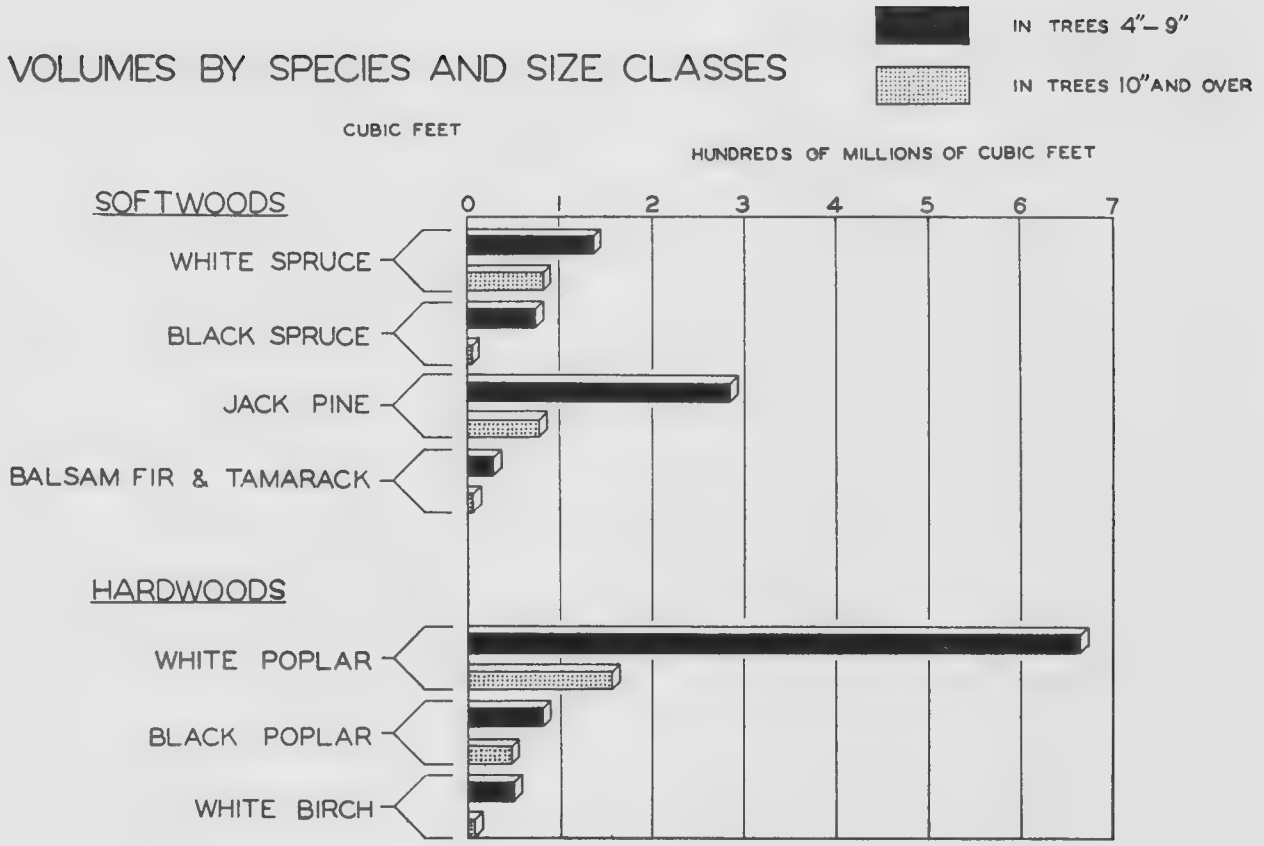


Figure 7 (Source Table 6)

CURRENT GROWTH

Growth data for softwood-spruce type, hardwood and mixedwood cover-types are obtained from stand density yield tables, constructed on the measurements of 326, 1/5 acre permanent sample plots. The increment boring method was adopted for growth calculation of even-aged jack pine stands. Seven hundred and fifteen, 1/10 acre sample plots were measured and over 2,000 increment borings gathered for this purpose.

The growth of black spruce stands is determined from special growth and yield tables for black spruce based on 150, 1/5 acre permanent sample plots.

In all cases the results of the growth studies are adjusted to fit the actual stand tables of the inventory volume sampling in each sub-type.

The total net growth of the growing stock in Meadow Lake Area is 49.5 million cubic feet, or 23 cubic feet per acre annually. Table 9 shows the distribution of this growth by species and size-classes. For practical conveniences the growth has been expressed in cubic feet, cords and board feet.

About 82 per cent, or 40.6 million cubic feet of this increment is on smaller trees 4 to 9 inches D.B.H. and 8.9 million cubic feet on trees 10 inches and over. White poplar alone accounts for 54 per cent of the total current increment. Jack pine gives the largest volume increment of all softwood species, amounting to 10.4 million cubic feet or 21 per cent of the total volume increment on the area.

White spruce and jack pine together are putting on annually an increment of 16.6 million board feet in trees over 10 inches D.B.H.

The amount actually available for cutting will be considerably lower, due to the timber losses caused by forest fires, insects and diseases. Stand size-classes, logging and economic possibilities will reduce it further.

The relatively high rate of growth in an expression of the preponderance of the younger age class and faster growing tree species, such as poplar and jack pine. This periodic growth rate can be used as a basis for calculation for a period of 10 to 15 years. At the end of that period of time these rates have to be adjusted to the actual stand conditions at that time.

TABLE 1—Land Classification in the Meadow Lake Area, 1953

Class of Land	Amount In Acres	Per cent. of Provincial Forest Area
TOTAL AREA	6,297,959	
PROVINCIAL FORESTS, Total	3,901,032	100.0
LAND:		
Productive Forest	2,524,944	64.7
Non-productive Forest	898,025	23.0
Non-forested Land	95,150	2 5
WATER	382,913	9.8
ALL OTHER AREAS	2,396,927	
SETTLED AREA	2,148,668	
NATIONAL PARK	229,748	
INDIAN RESERVE	18,511	

TABLE 2—Areas of Productive Forest Land by Cover-Types And Stand Size-Classes in Provincial Forests of the Meadow Lake Area, in Acres, 1953

	Total		Stand Size-Class			
			Saw-timber	Cordwood		Reproduction
Cover-Type	Area	Per cent Productive Forest	Over 70 feet tall	50-70 feet	30-50 feet	Under 30 feet
Softwood	579.251					
Spruce	191,273	7.6	2,739	18,995	133,250	36,289
Pine	387,978	15.4	2,471	65,925	289,029	30,553
Mixedwood	417,506	16.5	14,831	140,764	178,383	83,528
Hardwood	1,131,186	44.8	16,233	174,188	701,957	238,808
All Cover-Types*	2,127,943		36,274	399,872	1,302,619	389,178
Per Cent*		84.3	1.4	15.9	51.6	15.4

* Productive forest land of 2,524,944 acres (Table 1) also includes burn-overs 383,783 acres (15.2%) and cleared areas 13,218 (0.5%).

TABLE 3—Productive Forest Land Classification of the Meadow Lake Area by Map Sheets, 1953
(Acres)

Map Sheet	Total Area	Area in Provincial Forest							
		Total Provincial Forest Area*	Productive Forest Land						
			Total Productive		Softwood		Mixed-wood	Hardwood	Burn-over and Clearing
			Acres	Per Cent.	Spruce	Pine			
B/16 Duck Lake	231,450	48,117	37,376	77.67	799	1,727	6,865	25,702	2,283
F/9 Helene Lake	227,469	190,152	149,563	78.65	9,942	14,022	37,612	75,523	12,464
F/10 Turtle Lake	227,469	47,457	34,807	73.34	913	80	10,261	23,329	224
F/15 Horsehead Creek	226,138	144,387	112,870	78 17	17,116	21,144	20,414	45,277	8,919
F/16 Hunting Lake	226,138	216,795	160,518	74.04	13,428	11,096	27,845	34,797	73,352
G/1 Shellbrook	230,131	99,474	80,253	80.67	2,528	51,430	10,070	10,935	5,290
G/8 Clonfert	228,800	5,661	4,115	72.69	658	1,809	364	1,011	273
G/12 Leoville	227,469	78,516	65,456	83.36	3,017	1,422	7,581	37,838	15,598
G/13 Chitek	226,138	217,513	145,692	66.96	10,836	15,002	26,928	72,742	20,184
G/14 Big River	226,138	103,118	70,734	68.59	5,686	2,007	14,167	37,958	10,916
G/15 Bodmin	226,138	56,166	32,788	58.37	2,724	32	4,580	21,267	4,185
H/4 Prince Albert	230,131	22,256	21,405	96.17	933	14,951	977	2,559	1,985
H/5 Henribourg	228,800	26,852	22,580	84 09	751	12,828	4,347	3,609	1,045
J/2 Strange Lake	224,794	111,930	72,114	64 42	11,616	2,689	19,180	23,311	15,318
J/3 Taggart Lake	224,794	197,008	101,288	51.41	10,224	206	23,199	40,094	27,565
J/4 Green Lake	224,794	196,774	141,059	71.68	7,161	2,684	19,812	63,049	48,353
K/5 Pierceland	222,450	14,604	7,980	54.64	126	947	737	3,737	2,433
K/6 Goodsoil	222,450	76,682	56,513	73.69	911	844	5,992	43,597	5,169
K/7 Dorintosh	222,450	137,540	100,936	73 38	3,524	19,463	10,153	46,163	21,633
K/8 Island Hill	222,450	138,602	74,314	53.61	1,383	4,998	8,681	56,938	2,314
K/9 Waterhen Lake	222,093	222,093	146,935	66.15	8,101	24,286	29,957	72,905	11,686
K/10 Flotten Lake	222,093	222,093	170,355	76.70	6,822	29,385	17,252	100,459	16,437
K/11 Muskeg Lake	222,093	222,093	130,427	58.72	2,018	12,606	17,064	73,444	25,295
K/12 Cold River	222,093	222,093	158,668	71.49	1,484	9,574	36,523	83,114	27,973
K/13 Primrose Lake	220,749	220,749	62,000	28 08	4,047	10,614	14,748	23,268	9,323
K/14 Kesatasew Lake	220,749	220,749	81,369	36 86	12,436	37,250	4,802	8,276	18,605
K/15 Lost Lake	220,749	220,749	137,548	62 30	38,153	54,932	13,595	28,519	2,349
K/16 Keeley Lake	220,749	220,749	145,281	65 81	13,936	29,950	23,800	71,765	5,830
TOTALS	6,297,959	3,901,032	2,524,944	64.72	191,273	387,978	417,506	1,131,186	397,001

* Includes productive and non-productive forest, non-forested land and water.

TABLE 4—Sawtimber Volume by Species and Stand Size-Classes in Provincial Forests of the Meadow Lake Area, 1953

(In thousands of board feet)

Species	In all areas		In Sawtimber area	In Cordwood area
	Amount	Per cent.	Stands over 70 feet high	Stands 30 to 70 feet high
TOTAL SAWTIMBER	1,934,436	100 0	256,130	1,678,306
Softwoods, total	795,175	41.1	112,053	683,122
White spruce	402,868	20.8	93,794	309,074
Black spruce	15,100	0 8	974	14,126
Jack pine	345,652	17 9	12,088	333,564
Balsam fir	9,667	0 5	5,197	4,470
Tamarack	21,888	1 1		21,888
Hardwoods, total	1,139,261	58.9	144,077	995,184
White poplar	880,337	45 5	119,776	760,561
Black poplar	234,877	12.1	21,515	213,362
White birch	24,047	1.3	2,786	21,261

TABLE 4A—Sawtimber Volume Distribution by Diameter Groups in the Meadow Lake Area

(In thousands of board feet)

Species	10 inches and over		10 and 11 inch class	12 and 13 inch class	14 inches and over
	Board feet	Per Cent.			
ALL SPECIES	1,934,436	100 0	988,925	488,276	457,235
	100 0%		51.12%	25 24%	23 64%
Softwoods, total	795,175	41.1	404,856	185,923	204,396
	100 0%		50.9 %	23 4 %	25 7 %
White spruce	402,868	20.8	161,698	104,371	136,799
	100 0%		40.1 %	25.9 %	34.0 %
Black spruce	15,100	0 8	7,624	7,136	340
	100 0%		50.5 %	47.3 %	2.2 %
Jack pine	345,652	17.9	209,614	70,978	65,060
	100 0%		60.6 %	20.5 %	18 9 %
Balsam fir	9,667	0.5	4,657	2,812	2,198
	100 0%		48 2 %	29 0 %	22.8 %
Tamarack	21,888	1.1	21,263	625	
	100 0%		97.1 %	2.9 %	
Hardwoods, total	1,139,261	58.9	584,069	302,354	252,838
	100 0%		51.3 %	26.5 %	22.2 %
White poplar	880,337	45.5	474,535	241,592	164,210
	100.0%		53.9 %	27.4 %	18.7 %
Black poplar	234,877	12 1	90,582	58,655	85,640
	100.0%		38.6 %	25 0 %	36.4 %
White birch	24,047	1.3	18,951	2,107	2,989
	100 0%		78 8 %	8.8 %	12.4 %

TABLE 5—Cordwood Volume by Species and Stand Size-Classes in Provincial Forests of the Meadow Lake Area, 1953

(In thousands of cords)

Species	In all areas		In Sawtimber area	In Cordwood area	In Reproduction area
	Amount	Per cent.	Over 70 feet high	30 to 70 feet	Under 30 feet
TOTAL CORDWOOD	15,424	100 0	360	14,212	862
Softwoods, total	6,109	39.6	115	5,731	262
White spruce	1,606	10 4	83	1,512	11
Black spruce	886	5.7	2	751	132
Jack pine	3,305	21 4	12	3,192	101
Balsam fir	115	0 8	18	97	
Tamarack	197	1.3		179	18
Hardwoods, total	9,325	60.4	245	8,481	600
White poplar	7,806	50.5	219	7,141	447
Black poplar	937	6.1	13	894	30
White birch	582	3.8	13	446	123

TABLE 6—Cubic Foot Volume by Species and Tree Diameter Groups in Provincial Forests of the Meadow Lake Area, 1953

(In thousands of cubic feet)

Species	All diameters		Diameter groups	
	Amount	Per cent.	4-9 inches	10 inches and over
ALL SPECIES	1,690,325	100 0	1,311,950	378,375
Softwoods, total	690,280	40.8	519,429	170,851
White spruce	218,334	12 9	136,546	81,788
Black spruce	78,586	4.6	75,347	3,239
Jack pine	360,253	21.3	280,918	79,335
Balsam fir	11,927	0 7	9,866	2,061
Tamarack	21,180	1.3	16,752	4,428
Hardwoods, total	1,000,045	59 2	792,521	207,524
White poplar	818,116	48 4	663,549	154,567
Black poplar	127,962	7.6	79,583	48,379
White birch	53,967	3.2	49,389	4,578

TABLE 6A—The Volume and Influence of 4 - Inch Trees on the Volume of 4 - to 9 - Inch Class in the Meadow Lake Area

(In thousands of Cubic Feet)

Species	Diameter groups		
	4-9 inches	4 inch class alone	
		Amount	Per cent.
ALL SPECIES	1,317,950	206,780	15.8
Softwoods, total	519,429	63,058	12.1
White spruce	136,546	13,738	10.1
Black spruce	75,347	22,271	29.6
Jack pine	280,918	24,363	8.7
Balsam fir	9,866	1,309	13.3
Tamarack	16,752	1,377	8.2
Hardwoods, total	792,521	143,722	18.1
White poplar	663,549	119,999	18.1
Black poplar	79,583	12,366	15.5
White birch	49,389	11,357	23.0

TABLE 7—Average Volume per Acre by Stand Size-Class and Tree Diameter Groups in Provincial Forests of the Meadow Lake Area, 1953

Stand Size-Class	All diameters (cubic feet)	Diameter groups (inches)	
		4-9 inches (cords)	10 inches and over (board feet)
ALL SIZE CLASSES	759	6.9	869
Sawtimber	2,456	9.9	7,061
Cordwood	897	8.3	986
Reproduction	188	2.2	

TABLE 8—Wood Volume in Provincial Forests of the Meadow Lake Area by Map Sheets, 1953

Map Sheet	Thousands of Board Feet			Thousands of Cords			Thousands of Cubic Feet		
	Total	Softwood	Hardwood	Total	Softwood	Hardwood	Total	Softwood	Hardwood
B/16 Duck Lake	13,500	6,124	7,376	129	24	105	13,664	3,422	10,242
F/9 Helene Lake	95,093	45,979	49,114	912	321	591	96,125	37,245	58,880
F/10 Turtle Lake	16,093	7,483	8,610	165	35	130	17,237	4,668	12,569
F/15 Horsehead Creek	55,211	30,975	24,236	664	385	279	67,365	39,442	27,923
F/16 Hunting Lake	81,327	38,338	42,989	592	268	324	66,164	31,079	35,085
G/1 Shellbrook	38,546	30,610	7,936	445	350	95	46,267	36,754	9,513
G/8 Clonfert	1,613	891	722	19	12	7	1,987	1,251	736
G/12 Leoville	42,545	17,085	25,460	361	75	286	38,771	10,113	28,658
G/13 Chitek	117,864	45,448	72,416	934	302	632	102,087	35,492	66,595
G/14 Big River	49,238	19,098	30,140	409	131	278	44,156	15,234	28,922
G/15 Bodmin	37,336	9,652	27,684	257	71	186	28,777	8,067	20,710
H/4 Prince Albert	3,150	1,626	1,524	85	68	17	7,953	6,234	1,719
H/5 Henribourg	3,623	2,343	1,280	89	66	23	8,358	6,148	2,210
J/2 Strange Lake	100,037	34,364	65,673	581	248	333	68,681	28,346	40,335
J/3 Taggart Lake	148,846	45,500	103,346	818	280	538	98,635	33,292	65,343
J/4 Green Lake	159,507	56,411	103,096	834	219	615	103,267	30,046	73,221
K/5 Pierceland	6,122	1,774	4,348	44	12	32	4,903	1,432	3,471
K/6 Goodsoil	35,089	11,660	23,429	285	45	240	30,937	6,352	24,585
K/7 Dorintosh	54,493	30,744	23,749	434	183	251	47,917	22,414	25,503
K/8 Island Hill	57,740	17,804	39,936	438	83	355	49,213	10,785	38,428
K/9 Waterhen Lake	174,433	75,170	99,263	1,066	393	673	124,999	49,431	75,568
K/10 Flotten Lake	108,293	42,337	65,956	1,113	306	807	115,412	35,302	80,110
K/11 Muskeg Lake	109,207	36,782	72,425	780	213	567	86,838	25,988	60,850
K/12 Cold River	103,878	35,315	68,563	922	254	668	98,215	29,151	69,064
K/13 Primrose Lake	82,132	36,277	45,855	472	201	271	56,257	24,964	31,293
K/14 Kesatasew Lake	59,522	42,867	16,655	505	403	102	55,451	43,750	11,701
K/15 Lost Lake	51,022	26,293	24,729	976	698	278	93,182	65,155	28,027
K/16 Keeley Lake	128,962	46,218	82,744	1,093	456	637	117,492	48,716	68,776
TOTALS	1,934,422	795,168	1,139,254	15,422	6,102	9,320	1,690,310	690,273	1,000,037

TABLE 9—Periodic Annual Volume Increment by Species and Tree Diameter Groups in the Meadow Lake Area, 1953

Species	All diameters		Diameter groups (inches)	
	Thousands of cubic feet	Per Cent.	4-9 inches Thousands of cords*	10 inches and over (thousands of board feet**)
ALL SPECIES	49,518	100.0	478	44,470
Softwoods, total	16,673	33.7	155	17,575
White spruce	4,945	10.0	41	7,270
Black spruce	541	1.1	6	230
Jack pine	10,362	20.9	100	9,345
Balsam fir	248	0.5	3	125
Tamarack	577	1.2	5	605
Hardwoods, total	32,845	66.3	323	26,895
White poplar	26,868	54.3	273	18,265
Black poplar	4,429	8.9	33	7,925
White birch	1,548	3.1	17	705

* Cubic feet converted to cords, basis 85 cubic feet equal to one cord.

** Cubic feet converted to board feet, basis one cubic foot equal to five board feet.

METHODS OF SURVEY

The use of aerial photos, combined with comparative ground sampling, is the basis of the survey. Summer verticals at a scale of 1,320 feet to one inch, taken in the period 1945-50, have been used to outline the cover-type boundaries which were transferred on the base maps for area calculation and land classification.

Areas are measured by the dot-count method and their estimates given in this report are based on 100 per cent air photo coverage of all land in provincial forests in the survey area.

Forest stands on the productive land are classified into four cover-types: Hardwood, Softwood-spruce type, Softwood-jack pine type and Mixedwood. Each cover-type is divided further into four density levels, based on per cent of tree crown closure, and four height classes according to the average height of dominant stand. This stand classification brings the number of forest sub-types up to 64.

To determine volume, 1/5 acre sample plots were located at random or along random lines in representative cover-types. The sampling results of the representative sub-types were applied to the whole sub-type area to produce the estimates in terms of net merchantable volume. The volume in forest inventory statistics is calculated separately for trees from 4 to 9 inches D.B.H. and from 10 inches and over for each species and for every sub-type. There were 558 plots located and measured in the summer of 1952. In addition, some 450 sample plots from the growth and other surveys from the same area were used to strengthen the stand tables.

Local tree volume tables were prepared from appropriate standard tables and checked against the volume of randomly cut taper trees and their sectional volume measurements. The same taper tree measurements provided data for cull reductions.

The statements on current growth are based on rates of growth developed in a series of special growth studies and adjusted to the actual stand tables of each sub-type.

Photo No. 10. A sampling crew is moving.

ACCURACY OF DATA

There are two main sources of error — errors in the classification, collection and compilation of measurement data, and errors of sampling. The former result from instances of judgement or technique and could be called human errors, while sampling errors are theoretical measures of the reliability of estimates based on the variability of sample measurements.

Care was taken to maintain a uniformity of standards - to minimize errors of photo classification, plot sampling, construction of local volume tables, stand tables, cull factors, etc. Sample plots with volume deviations more than two standard deviations have been rejected and the suitability of local volume tables was kept on a level with the aggregate difference close to one per cent and the average deviation less than ten per cent.

On statistical analysis it was found that the pooled sampling error in the Meadow Lake Area was 2.5 per cent. Such a statement means that the total merchantable volume for the above area is within 2.5 per cent of the stated volume, two chances out of three.

As the percentage error increases with each subdivision of the total, the reliability of volumes for smaller areas or each sub-type is less, therefore indicating only relative magnitudes.

Area estimates have no sampling error because the area was covered by complete aerial survey.

The randomized sampling method and the use of statistical methods in the compilation assured the attainment of any desired accuracy. The degree of accuracy can be controlled by altering either the number of sample plots or the size of the samples — or both.

DEFINITION OF TERMS

Volume Classification

Sawtimber—Volume contained in trees 9.6 inches and over (diameter breast high) regardless of stand size-class in which they occur, expressed in board feet, International ¼" scale.

Cordwood—Volume of solid wood inside bark contained in trees 3.6 to 9.5 inches in diameter, expressed in standard cords of 128 cubic feet of stacked rough wood.

Cubic foot volume—Volume of solid wood inside bark of all trees 3.6 inches in diameter and over.

Limits of merchantability

For Sawtimber—Stump one foot, variable top diameter inside bark averaging 6 inches.

For Cordwood—Stump one foot, top diameter inside bark 3 inches.

Net merchantable volume—Merchantable volume of sound wood. Deductions for cull based on averaged measurements of felled sample trees. Volumes in this report are net merchantable unless otherwise noted.

Gross merchantable volume—Merchantable volume with no deductions for cull made, in cases where reliable cull factors are not yet available.

DEFINITION OF TERMS (Continued)

Area Classification

Forest Land Area

Productive forest — Land which will produce a forest crop of merchantable size and form within a reasonable period of time.

Non-productive forest — Land incapable of producing a forest crop of merchantable size within a reasonable period of time. Includes treed muskegs and a proportion of softwood stands judged to be stagnant.

Non-forested — Includes open swamps, grassland bush, rock, cultivated land and urban areas.

Stand size-classes

Sawtimber area — Stands over 70 feet in height.

Cordwood area — Stands averaging 30 to 70 feet in height.

Reproduction area — Stands under 30 feet in height.

Cover-types

Softwood — Stands containing over 75 per cent softwoods by volume.

Mixedwood — Stands in which neither softwoods nor hardwoods constitute 75 per cent of the stand volume.

Hardwood — Stands containing over 75 per cent hardwoods by volume.

Merchantability

Merchantable — Stands over 30 feet in height.

Young growth — Stands on productive forest land under 30 feet in height.

LIST OF SPECIES

SOFTWOODS

White spruce	—	*Picea glauca* (Moench.) Voss.
Black spruce	—	*Picea mariana* (Mill.) B.S.P.
Jack pine	—	*Pinus Banksiana* - Lamb.
Balsam fir	—	*Abies balsamea* (L.) Mill.
Tamarack	—	*Larix laricina* (Du Roi) K. Koch

HARDWOODS

White poplar	—	*Populus tremuloides* - Michx.
Black poplar	—	*Populus balsamifera* - L.
White birch	—	*Betula papyrifera* - Marsh.

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